



UNITED STATES NAVY

MEDICAL NEWS LETTER

Rear Admiral Bartholomew W. Hogan MC USN - Surgeon General
 Captain Leslie B. Marshall MC USN (RET) - Editor

Vol. 32

Friday, 22 August 1958

No. 4

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Motor Vehicle Accidents - 1957

Every 76 minutes during 1957, on the average, a member of the Navy or Marine Corps was admitted to a medical facility for treatment of injuries received in a motor-vehicle accident. Every 15 hours, a naval serviceman was killed or died from similar injuries, and each day, 853 motor-vehicle accident victims were on the sick list. At one time, "going to sea" was considered a rather hazardous occupation, but the dangers pertaining to the sea are small as compared with the present-day hazards of "going on the road." Road traffic has become one of the most acute social, economic, and medical problems of the age.

Although the statistics on motor-vehicle accidents for Navy and Marine Corps personnel were still alarmingly high in 1957, the over all picture was more favorable than in the preceding year. As compared with the 1956 rates for motor-vehicle injuries, the admission rate was down 11%, the noneffective rate dropped 4%, and the death rate decreased by 9%.

There were 6943 persons admitted to the sicklist in 1957 for injuries caused by motor vehicle accidents, resulting in an admission rate of 790 per 100,000 average strength. Admission rates by naval district ranged from a low of 628 per 100,000 for personnel stationed in the 3rd Naval District to a high of 1321 per 100,000 in the 13th Naval District.

Traffic accidents—those occurring on public roads, streets, and highways—accounted for 6840 (98.5%) of the admissions due to motor-vehicle injuries. Nontraffic accidents—those happening on parking lots, private driveways, within boundaries of military bases, et cetera—chalked up a total of 103 (1.5%) of the 1957 admissions.

More admissions for motor-vehicle accidents occurred on 1 January than on any other day of the year. This was true for both 1956 and 1957. On 1 January 1956, there were 71 admissions and on this date in 1957, the number recorded was 49. The day which had the second highest number of admissions in 1957 was 16 February with 48 admissions. For the entire year, more accidents occurred on Saturday than any other day of the week. Almost one-fifth (1300) of the total admissions were on Saturday. Motor-vehicle accidents were not consistently concentrated in any one month.

The most frequent cause of these accidents involved running off the roadway without an antecedent collision, causing 31% of the accident admissions and 33% of the deaths. This would indicate the driver was at fault—perhaps driving too fast, being too sleepy from a long driving spell, or failing to skip the last drink which was "one for the road." The second leading cause was collision with another motor vehicle which was responsible for 28% of the admissions and another 33% of the fatalities.

A recent research study at the Marine Corps Base, Camp Lejeune, N. C., brought out the fact that the average accident driver was a base-residing, young, unmarried, noncareer man of the lower enlisted grades

in an off-duty status. The accident happened most frequently while he was driving a recently purchased, used vehicle within 20 miles of the base late at night or early in the morning. Admission rates for enlisted personnel were more than three times those for officers.

Distribution of patients by age and length of service is shown. The extremely high admission rates of the Navy and Marine Corps groups aged 20-24 indicate that accidents at this age occur more often than warranted by their relative strength. The groups reporting the second highest admission rates were the same as last year—"under age 20" for the Navy and 25-29 for the Marine Corps. Navy personnel aged "45 and over" showed the greatest improvement over their 1956 record of accidents. They not only had the lowest admission rate for 1957, but also reported the greatest percentage decrease from 1956—almost a 50% drop. As in 1956, the Marine Corps personnel aged 20-24 had the least favorable motor-vehicle-accident experience in 1957, but at the same time reported a drop of 23% in admission rate. The median length of service for all motor-vehicle-injury cases was 3 years.

Ninety percent of the motor-vehicle admissions in 1957 were due to accidents occurring while the personnel involved were on leave or liberty. During 1955 and 1956, this proportion was 88%. Recruits report the lowest admission rates—undoubtedly due to curtailment of leave during recruit training.

Twelve percent of Navy traffic injury admissions involved motorcycle riders, while for the Marine Corps, the comparable proportion was only 6%. The types of vehicles causing relatively more accidents among members of the Marine Corps than the Navy are military passenger-carrying vehicles, trucks or buses, and tanks or tractors. They contributed 10% of the Marine Corps' traffic-accident admissions in contrast to 4% of the Navy's.

A third of the Navy and Marine Corps motor-vehicle-accident cases in 1957 were admitted to the sicklist with the diagnosis of "fracture." "Wound, incised and lacerated" and "abrasion" figures in about another third of the injuries. The diagnosis "injuries, multiple, extreme," which generally describes dead-on-arrival cases, was the diagnosis applicable to over half of the fatal cases.

Severity of accidental injuries can be judged partially by the extent of hospitalization required for recovery. About one-third of the 7157 motor-vehicle injury cases leaving the sicklist in 1957 had required a month or more of hospitalization. Of these, 912 cases had 30-59 sick days, 1509 cases had 60-364 sick days, and 68 naval servicemen had been either hospitalized or on sick leave for a year or more.

As to the matter of total hospitalization, motor-vehicle-injury cases accumulated 311,423 days on the sicklist in 1957, or an average of 45 days per new case as compared with 42 days in 1956.

Pedestrians injured in traffic and nontraffic mishaps averaged more than 70 days on the sicklist. Motorcycle accidents also caused long periods of hospitalization—an average of 52 days.

The most tragic part of the motor-vehicle-accident picture, of course, was the 570 servicemen who lost their lives. The death rate of 65 per 100,000 average strength was lower than the comparable rate of 72 in 1956. Although fewer were killed in 1957, there were also fewer admissions and the fatality ratio (8.2 deaths per 100 admissions) was a little higher than in 1956 (8.1). Four out of five fatal cases had zero days on the sick list—most of these being "dead on arrival". Another 11% survived less than 5 days. However, 5 cases which terminated in death were on the sicklist from 35 to 150 days. Off-duty accidents were responsible for 92% of the deaths. A short weekend liberty pass is a temptation to drive far and fast to be with distant family and friends. Too often, it turns out to be a pass to eternity.

Long after the crashing sound of the auto collision and the wail of the ambulance have died away, there remain the suffering of the victim, the anxiety of loved ones, long and expensive months of hospitalization, and too often, physical disabilities to be borne for the remainder of life.

After hospitalization, about 6000 patients were able to return to duty. However, even after extensive hospitalization, all accident patients do not recover sufficiently for a duty status. Of those injured during 1957, approximately 370 were invalided from the service because of accident injuries or sequelae.

The servicemen killed and invalided from service because of motor-vehicle-accidents spell out a great tragedy to their families and friends. This tragic loss of lives and manpower is also a tremendous expense to the Navy and Government in terms of lost training investment, burial costs, and survivor and retirement benefits. How much the naval services lose in terms of training investments can be more fully realized from the statement that the total years in service accumulated by those killed in 1957 were equivalent to almost 2-1/2 centuries of time, or full 30-year naval careers of approximately 800 men. In terms of monetary figures, it is estimated that the 1957 motor-vehicle accidents represent a cost of 25.6 million dollars to the Government.

The traffic accident problem is not confined to military personnel alone. From the entire population of the United States, over 38,000 motor-vehicle deaths and about 1,350,000 injuries occurred during 1957. Many groups and organizations are concerning themselves with the various factors involved in these accidents. Findings of statistical research teams show that collaboration among engineers, manufacturers, and doctors is needed to accomplish effective preventive measures against this growing peril. Until recently, studies were directed mainly toward ascertaining the causes of accidents. Now, research programs are turning their attention to the car and the driver.

The Navy and Marine Corps are placing increased emphasis on various safety programs to prevent motor-vehicle accidents. New research programs are giving added attention to the safety factors in vehicular design and to the

physical and psychological characteristics of vehicle operators. (Motor-Vehicle Accidents - 1957: Statistics of Navy Medicine, 14: 5-13, July 1958)

Rear Admiral B. W. Hogan MC USN, the Surgeon General, in a foreword to this article stated "If we are to make significant advances in coping with this problem, we must concentrate further effort toward understanding the psychological as well as the physical factors involved. For the Navy, this means greater emphasis on dynamic and effective programs in safety and applied research. For the individual naval man, it means taking heed of his responsibilities when he gets "behind the wheel." It may seem trite, but still it is true, that the observance of the rules of safety and decent conduct can mean "The Life You Save May Be Your Own."

* * * * *

The ECHO Viruses

A recent estimate places the number of new human viruses which have been discovered since 1948 at 70. The dilemma which this appalling number of newcomers presents to students of infectious disease involves many problems in virology as well as the important question - What role do these agents play in human disease? As for the new and growing ECHO group of enteric viruses, now numbering 20, an encouraging beginning has been made: It has been possible to evaluate at least some of these agents in terms of their disease-producing potential and to place them with respect to other viral enteric pathogens, namely, the Coxsackie and poliovirus groups. In fact, the 20 ECHO, 24 Coxsackie, and 3 polioviruses have recently been joined together to form the Enterovirus group. The reasons for this grouping are the similarities between the three families of viruses: They are all common inhabitants of the human intestinal tract; they have epidemiological features in common, and they produce a range of human infection from completely inapparent or minor febrile illnesses to aseptic meningitis and, in the case of polioviruses at least, to myelitis with paralysis.

ECHO viruses (whose name stands for enteric cytopathogenic human orphan) are the newest members of the enterovirus group. Their name is descriptive of their history and character: They have been isolated frequently from human excreta, their discovery actually being a byproduct of tissue-culture tests for the presence of polioviruses in fecal samples; they cause specific cytopathic changes in certain primate tissue culture cells, but (with some exceptions) do not produce disease in any of the usual laboratory animals, and they are—or were—largely "orphans" from the standpoint of their place as pathogens because their relationship to disease was in the beginning quite unknown and is only gradually becoming apparent.

Although the exact mode of spread of ECHO viruses is not known, the evidence suggests that human association is the most important means. The pattern of infection in families is similar to that associated with Coxsackie and polioviruses and it is probable that similar mechanisms are involved in infection with all three members of the enterovirus group, the oropharynx being the portal of entry; the intestinal tract, the primary site of attack; and the feces, the chief means of excretion. Seasonal distribution of ECHO viruses is another characteristic shared with Coxsackie and polioviruses.

With such wide distribution of ECHO viruses, the question arose early as to whether these agents might not be normal or permanent inhabitants of the intestinal tract, rather like nonpathogenic bacteria, such as *Escherichia coli*. That this is not the case is indicated by the transience of the infection and carrier state, the large proportion of young children among carriers, the relative infrequency of carriage among adults, and the seasonal occurrence of the agents.

The illnesses associated with enteroviruses are indicated in a Table. There are no distinguishing clinical features which indicate that in a given case the infection is due to a member of the ECHO group rather than one of the other enteroviruses, but certain characteristics are helpful in suggesting the possibility. One of these is the presence of rash. To date, rash has been noted in infections with ECHO virus Types 4, 6, 9, and 16, and there has been an associated enanthem with Types 9 and 16. In addition, an exanthem has occurred with certain Coxsackie A-9 infections and with infection associated with new strains not belonging to any of the 20 designated ECHO types. Both aseptic meningitis and cases of mild febrile illness have been associated with rash.

Aside from rash, the illnesses associated with ECHO virus infections have not been significantly different from aseptic meningitis or mild non-specific febrile illnesses associated with other enteroviruses. Moderate fever, severe headache, and stiff neck and/or back have been the most prominent features in those with C. N. S. involvement. In certain outbreaks, severe muscle pain has occurred, and in one due to ECHO 9, relapses were reported as not uncommon.

The occurrence of a biphasic course similar to that found in poliomyelitis has been noted in several epidemics, but this does not seem to be as common a feature as in children with poliomyelitis, 40% or more of whom may show this feature. If any difference can be noted between the "minor illness" of first phase or abortive poliomyelitis and the febrile illnesses associated with ECHO viruses, it is one of degree: the "minor illness" or abortive poliomyelitis is usually a milder affair, most often only 24 hours in duration and less apt to be associated with headache and vomiting.

ECHO viruses, a rapidly growing family of 20 recently discovered agents belonging to the enterovirus group, are common inhabitants of the

human intestinal tract, particularly in the summertime. In addition to inapparent infection, certain types may cause mild febrile illness, diarrheal syndromes, or aseptic meningitis. Some types have been associated with widespread epidemics in Europe and the United States. A rubella-like rash has been a prominent feature of epidemics due to Types 4, 9, and 16. Antigenic diversity and clinical surprises have been the rule in the short history of ECHO viruses. There is reason to believe that these characteristics will continue and that the family will grow in number and complexity. (Horstmann, D. M., *The New ECHO Viruses and Their Role in Human Disease*: Arch. Int. Med., 102: 155-160, July 1958)

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Recurrence of Nevi after Incomplete Removal

Along with recent advances in the knowledge of pigment formation and of pigment-cell biology, there has been an increasing interest in the pigmented mole or nevus. Because it is an extremely common lesion and clinically often disfiguring, many patients are seen who desire cosmetic removal of these moles. Much has been written about benign pigmented nevi, their pathology, relation to melanoma, and their treatment, but little has been published about treatment failures and recurrence. This article discusses various mechanisms by which benign nevi may recur after treatment, and evaluates the significance of such recurrence.

Several methods of dealing with the common mole are described in the literature. These may be divided into two main types: deep excision which removes the entire lesion and other methods which do not completely remove it. Many dermatologists feel that malignancy in the common mole can be reliably ruled out with expert clinical examination and that such clinically benign lesions may be safely removed by use of electrocautery, electrodesiccation, or by merely slicing off the protruding portion.

After superficial removal of this type—which is used simply for cosmetic purposes—there must necessarily be a certain percentage of recurrence. In one series, of 129 small pigmented lesions, 4 were excised because of failure of previous treatment. In another series of 204 nevi, 2 had had prior unsuccessful removal.

Two types of clinical appearance of these recurrences are described. The lesion may reappear as (1) an area of pigmentation, or (2) an elevation at the site of previous removal. Walton et al. state that pigmentation remained in about half of their series of 168 clinical moles which were removed by slicing and light electrodesiccation, but that in only 1 case of their completed series of more than 100 lesions which were followed and rebiopsied was there a definite recurrence of the lesion as a flat area of pigmentation.

When this present study was begun, there had been no systematic investigation of the mechanism and of the significance of these benign recurrences. Gougerot, who observed nevi to recur in the scar of previously destroyed nevi, felt that this recurrence was due to seeding of the nevus cells during removal. This concept of the mechanism of recurrence continues to be upheld in Europe where some believe that even biopsy of a pigmented lesion should not be attempted until high doses of irradiation have been applied to prevent growth of any possibly seeded cells.

Recently, Walton, Sage, and Farber made an excellent study of this problem. They sliced off the superficial portion of the mole and cauterized the remaining denuded surface. The slice was examined microscopically to determine the exact nature of the lesion. After varying periods of time, the treated site was rebiopsied and the specimen was compared with the earlier biopsy. They found that in no case was there any tendency toward malignant change in the lesion and that when there was a recurrence it resembled the original lesion.

This study concerns 19 cases of recurrent pigmentation after cosmetic removal of a mole. The site of recurrence was excised for microscopic study. In the interpretation of histologic findings, the authors follow the generally accepted view that most nevi originate at the dermo-epidermal junction from the melanocytes which are present normally, through their multiplication and transformation into nevus cells. They agree with those who accept the neural crest origin of melanocytes and do not believe that they are modified epidermal basal cells. They also agree that each nevus has a natural history beginning as a simple lentigo in which melanocytes accumulate at the dermoepidermal junction. These melanocytes form larger nests of nevus cells at this junction. Some or all of these nests may become detached from the epidermis and surrounded by mesodermal fibers of collagen, elastin, and reticulum. In the final mature stage of the nevus, all nests are in the dermis and none are left at the junction.

According to these three stages of development, nevi are divided into junction, compound, and intradermal lesions on histologic examination. It must be realized, however, that these terms refer only to the prevalent localization of the cell nests. Most junction nevi show some intradermal nests and many mature, clinically quiescent nevi show some junctional nests. This latter finding increases in direct proportion to the number of sections examined from each individual nevus and it is likely that fewer intradermal nevi would be recognized if each lesion were examined in complete serial sections.

The findings in 19 cases are summarized in a Table. Certain features are common to these cases. The original lesion is diagnosed as a common benign mole and is incompletely removed. After a varying period of time—usually a number of months—pigmentation recurs. The tumor mass itself does not regrow.

Nevus cells—especially early in their development—when they are junctional and active, are also found with the basal cells of the epidermis and with the follicular sheath of the hair. It is to be expected that any nevus cells present in such areas, such as in a compound nevus which is removed for cosmetic purposes, would be carried along with the regenerating epithelium over the denuded area. In some cases, they obviously multiply and form a new junctional nevus above the quiescent intradermal remnants of the old nevus.

The question of the prognostic significance of this process then arises, whether this means activation of a quiescent nevus implying possible progression to a malignant state. There is no evidence of such implication in either Walton's or the authors' material. Walton found that no junctional activity occurred in any nevus which did not show it in the original lesion. The two cases in the present series in which the original nevus was available for study support this view. In none of the cases was there evidence of the criteria upon which the diagnosis of malignancy in a cellular nevus rests. There were no mitoses, no cells of unusual size, and no reactive inflammatory infiltrate.

Instead, it seems that the nevus relives an early part of its natural history. Just as in children, the finding of a junction nevus is the common expected occurrence and does not imply malignant development, so here in a young epidermis, nevus cells form junctional nests. From the experience of a great number of dermatologists polled in a recent survey, it may be presumed that this process eventually would have reached a stage of balance and quiescence.

The authors' experience in these and other cases and with Walton's study suggest that it is preferable to microscopically examine at least the superficial portion of nevi removed for cosmetic purposes. Such examination would allay anxiety of the patient and enable recognition of the extremely rare nevus that shows histologic evidence of malignancy in spite of clinical quiescence as determined by an experienced dermatologist. (Schoenfeld, R. J., Pinkus, H., The Recurrence of Nevi after Incomplete Removal: Arch. Dermat., 78: 30-34, July 1958)

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Urethral Diverticula

Increasing experience with the diagnosis and management of suburethral diverticula on the gynecological service of the Johns Hopkins Hospital has led to the accumulation of a series of 121 cases of a lesion once considered rare.

There has been much discussion as to whether urethral diverticula constitute a congenital or an acquired lesion. One case in this group is

undoubtedly congenital in origin, the diverticulum representing the point of insertion of an ectopic ureter. Some authors have suggested that the trauma of childbirth plays an etiologic role. Analysis of the parity in this series does not support such a conclusion.

Some indirect support of the acquired nature of the majority of diverticula is obtained by examination of the age at which symptoms first appeared in patients later found to have the lesion. Only two of the total series of 121 cases were symptomatic prior to the age of 15, while the great bulk of patients developed symptomatology between the ages of 20 and 40 years. One might reasonably expect an earlier expression of the disease, were it predominantly of congenital origin.

On the basis of the comparatively late development of symptomatology, as well as the lag between the development of symptomatology and the appearance of a clinical lesion, the authors are inclined to agree with Routh that suburethral diverticula largely represent an acquired lesion of infectious etiology.

The most common complaints presented by patients in this series were those of frequency (100 patients) and dysuria (76 patients). While the majority of these women gave a history of recurrent attacks of cystitis, the symptomatology associated with suburethral diverticula is truly protean. Indeed, nine patients denied any complaints whatsoever referable to the urinary system, a sizable diverticulum constituting an incidental physical finding.

With regard to the symptoms of terminal dysuria (16 cases) and sense of incomplete voiding (32 cases), it is only within the comparatively recent past that a significant proportion of the clinical histories contain definite statements as to the presence or absence of these complaints, so that the actual incidence may be somewhat higher than here indicated.

Chronicity of symptomatology is by no means a uniform finding, although suburethral diverticulum should certainly be ruled out in any patient with chronic or recurrent unexplained urinary complaints. Seventeen patients reported no attacks of cystitis in the year immediately prior to the diagnosis, while an additional 20 cases reported only one attack of cystitis in the preceding year, so that 31% of the total series certainly did not present with an unremittingly symptomatic lesion. Conversely, 24 patients, or 20%, of the total series, reported experiencing three or more attacks of cystitis in the year preceding the diagnosis of suburethral diverticulum. Prolonged periods of spontaneous remission of symptoms were not uncommon.

The most important single diagnostic instrument for the discovery of suburethral diverticula is a high index of suspicion. The finding of a suburethral mass and the expression of pus from the external urethral meatus on routine stripping of the urethra during the course of pelvic examination, remain the classic diagnostic maneuvers.

While cystoscopy remains an invaluable tool in the diagnosis and management of urethral diverticula, it appears to be more fallible as a screening

technique than urethrography. Seventy-four patients with proven diverticula had the benefit of water cystoscopy. In 12 of these cases, a urethral orifice was never visualized cystoscopically. An additional 16 patients underwent four or more unproductive cystoscopies prior to the discovery of the diverticulum.

The authors believe that every case should have the benefit of urethrography prior to surgery. The existence of a compound or multilocular diverticulum cannot be predicted by reliance on cystoscopy alone. Furthermore, while endoscopic inspection of the urethra may disclose the presence of one diverticular orifice, other orifices may be present concurrently. Twenty-eight patients in this series were found to have either multiple or compound diverticula.

There is general agreement in the literature that surgical excision of the diverticulum, when feasible, is the procedure of choice. (Davis, H. J., Telinde, R. W., Urethral Diverticula, An Assay of 121 Cases: J. Urol., 80: 34-38, July 1958)

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Chronic Pleural Empyema

In recent years, the prognosis of chronic pleural empyema has improved to a remarkable extent. Although much of this improvement is attributable to the use of potent antibacterial agents, other factors undoubtedly have contributed to these results. In attempting to evaluate some of these factors, one discovers that it is difficult to gain an adequate perspective from recent reports as they are generally limited to scope and occasionally are controversial. As it seemed likely that the experience in a hospital for thoracic disease might provide such information, it was decided to review the cases of chronic empyema treated surgically at the Ray Brook State Tuberculosis Hospital, N. Y., between January 1950 and October 1957.

To provide a basis for comparison, both tuberculous and pyogenic empyemas were included in this study. Several sterile empyemas were also included. Patients treated merely by thoracentesis or surgical drainage were excluded. Thus, there were available for study 45 patients treated by 56 definitive surgical procedures. Thirty-nine patients had pulmonary or pleural tuberculosis at one time or another. The remaining 6 patients had, in addition to empyema, the following diseases: cystic disease of the lung, 1; bronchogenic carcinoma, 1; spontaneous pneumothorax, 1; pyogenic pneumonia, 2; pulmonary disease of undetermined etiology, 1. The empyemas followed thoracotomy in 29 instances; 9 complicated therapeutic or spontaneous pneumothorax; 10 were primary. When first bacteriologic studies were performed at Ray Brook, 23 empyemas yielded tubercle bacilli, 8 yielded mixed tuberculous and pyogenic organisms, 11 yielded pyogenic

organisms, and 3 yielded purulent material sterile on culture. The pyogenic infections usually included staphylococci. By the time surgery was undertaken, the number of tuberculous and mixed tuberculous and pyogenic infections had decreased to 16 and 7, respectively; the number of pyogenic infections and sterile pleural spaces had increased to 13 and 9, respectively.

It is interesting to note that, of the 7 patients with mixed tuberculous and pyogenic empyema at the first bacteriologic examination, 6 had already been subjected to thoracotomy and 1 had received a recent bronchogram—a possible source of contamination of the pleural cavity. Of 14 patients with pure pyogenic empyemas at the first bacteriologic examination, 11 had been submitted to previous chest surgery. These findings are especially interesting because the authors observed pleural spaces communicating with the bronchial tree for prolonged periods without detecting evidence of infection. Therefore, it would appear that secondary pyogenic infection is frequently iatrogenic—a belief which is certainly not new.

From a Table, it may be inferred that tuberculous empyemas frequently can be rendered sterile by drug therapy alone. Almost all will respond favorably to drug therapy combined with adequate surgery. On the other hand, surgery without adequate antituberculous drug therapy is not often successful.

The prognosis for mixed tuberculous and pyogenic empyema is no longer as poor as it was prior to the introduction of antituberculous drug therapy. The presence of secondary pyogenic infection does not seem to affect the response of the tuberculous infection to antituberculous drug therapy.

Surgery was performed in 56 instances. To be successful, definitive surgery should obliterate the pleural space. A persistent pleural space—even if sterile—is a potential invitation to infection. Standard and plombage thoracoplasty are of limited value and are useful only when the walls of the empyema are not very rigid. Plombage thoracoplasty is occasionally complicated by infection in the subcostal space. On the other hand, the Grow modification of the Schede procedure can be used with little fear of deformity and with excellent results; being confined to the diseased area, it is well tolerated by the poor-risk patient. It can be performed in stage, or repeated should the first procedure fail to achieve the expected result. It is important to remove foreign bodies, such as surgical silk or calcium deposits, as these may be a source of chronicity. A simple method of removing calcium is curettage. The wound may be sutured almost completely at the time of surgery. Adequate drainage should be maintained with a soft rubber tube until the empyema space has been obliterated from the depths outward. A pressure dressing for several weeks will foster early obliteration of the space.

Decortication has proved most useful in expanding lungs which contain little disease and where the empyemas have been of relatively short duration or small size. Appreciable pulmonary fibrosis is a well-known cause of poor postoperative re-expansion. Longstanding empyema may involve the

underlying lung so as to produce a similar effect and, if the empyema involves a large proportion of the lung surface, postoperative re-expansion of the lung may be poor. On the other hand, if the empyema involves only a small portion of the lung surface, the remaining lung will often expand appreciably if it is completely freed, including the fissures. A poorly expansile lung may be useful as a space filler. For this reason, resection of such a lung is rarely performed with decortication except for indications applicable in the absence of empyema. Although parietal decortication would seem generally desirable, it does not appear necessary to effect a cure of empyema. Parietal pleura may be allowed to remain if one wishes to minimize blood loss. Occasionally, in these instances, pleural symphysis may be delayed, but this does not seem serious. Pulmonary expansion following decortication appears to have no ill effects upon pulmonary tuberculosis, provided adequate antituberculous therapy is administered.

This review of almost 7 years' experience with chronic empyema reveals that with proper treatment the prognosis is excellent regardless of the type of infection. (Pecora, D. V., *The Surgical Treatment of Chronic Pleural Empyema*: J. Thoracic Surg., 36: 92-101, July 1958)

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Treatment of Tuberculosis Today

This article summarizes observations in over five hundred consecutive patients with proved tuberculosis admitted for treatment to the Central Washington Tuberculosis Hospital between June 1, 1952 and December 31, 1956. Antituberculous drug therapy had not been given these patients before admission here; some had had previous collapse therapy or bedrest in other institutions. The cases include all types of tuberculosis—primary, reinfection, pulmonary, and extrapulmonary—and all age groups. The diagnosis was proved either by positive cultures, positive pathological findings, or both. All patients had been given the three most effective and least toxic antituberculous drugs, streptomycin, para-aminosalicylic acid and isoniazid, along with early surgery when indicated. The regimen included modified bedrest with full lavatory privileges for all patients and they were permitted to go to the cafeteria as soon as physically able after admission. Upon discharge, all patients returned to their former occupations regardless of physical activity involved.

The patients were hospitalized for an average of 212 days. One hundred and forty-two patients were treated surgically and 188 patients were treated medically. There was a minimum follow-up of over 24 months.

There are five characteristics of tuberculosis which make it a particularly difficult disease to treat: First is the tendency of tubercle bacilli to become resistant to any known antibiotic when they can continue to multiply

in the presence of small concentrations of the drug; second is the tendency of blood vessels in the diseased area to become obliterated which, in turn, further decreases the concentration of drugs where they are most needed; third is the tendency of the disease to produce destruction of tissue (caseation) which then has no blood supply and the drugs cannot diffuse into it in sufficient quantity to be bactericidal; fourth is the presence of viable tubercle bacilli inside macrophages so that an antibiotic, such as streptomycin which does not penetrate the cell membrane, is not effective; and fifth is the tendency to obstruct the normal drainage pathways, for example, in bronchial stenosis or ureterostenosis.

An organized treatment program is described for all types of tuberculosis, using streptomycin, para-aminosalicylic acid, and isoniazid, together with early surgery when indicated.

The three-drug combination resulted in negative sputum and gastric cultures in 84% of all patients by the end of 4 months. In those whose cultures remained positive, antibiotic-resistant organisms developed.

Resectional surgery is indicated in pulmonary tuberculosis for the following reasons: (1) to convert to negative the cultures of patients positive after 3 months of drug therapy; (2) to remove the types of infected tissues likely to cause reactivation of disease or which have already caused reactivation, namely caseous lesions 2 cm. or more in diameter, cavity, and advanced bronchial disease including stenosis, bronchiectasis, and tuberculous bronchitis; and (3) decortication for restoration of pulmonary function after extensive pleural change from pneumothorax or pleural effusion.

Tubercle bacilli resistant to a major drug (streptomycin or isoniazid) are found in patients on the first admission even though they have never received the drug and could not have contracted their disease from someone who had received the drug.

In patients with persistently positive cultures for 6 months or longer, organisms develop which are resistant to the major drugs, and when resected, have a high incidence of complications including bronchopleural fistulas, positive cultures after resection, and reactivation after discharge.

Even though drug therapy may convert gastric and sputum cultures to negative, the infected lesion is not necessarily sterilized because in a significant number of these patients, a positive smear or culture is obtained from resected specimens or the disease is reactivated later.

Drug therapy is merely a tool in the treatment of tuberculosis, effective for a limited time, and if not properly used, the patient will have lost the opportunity for successful resection.

Reactivation is due to the presence of virulent, viable tubercle bacilli in certain types of infected tissue into which the drugs cannot penetrate. The extent of disease is a factor in reactivation because the more extensive the disease, the greater the likelihood of serious pathological change being present; thus, minimal disease responds well to drugs only whereas surgical

patients do better than medical patients with moderately and far advanced disease because the source of reactivation has been removed.

With routine anteroposterior tomographs and right angle and fore-oblique telescopes for use in bronchoscopy, it is possible to demonstrate most types of tissue involvement which are likely to cause reactivation.

Caseous disease is the most common pathological change found in patients in whom reactivation occurs; therefore, it is as dangerous a lesion as open cavitation when it has a bronchial connection which is manifest by positive cultures before drug therapy is started.

Endobronchial disease is the second most common pathological change found in patients in whom reactivation occurs. This applies both to tuberculous bronchitis and to bronchial stenosis of the segmental bronchi.

The purpose of follow-up is to detect reactivation of disease before there is progression. Therefore, gastric cultures should be obtained about 6 months after stopping combined drug therapy. Patients may have positive gastric cultures a year or more before there is x-ray evidence of new disease or before they will admit to bringing up sputum.

While certain groups of patients have a higher incidence of toxic reactions to the various drugs (for example, the P. A. S. reactions in patients with emphysema, streptomycin, and dihydrostreptomycin reactions in patients with renal tuberculosis, and isoniazid reactions in patients with epilepsy), these reactions can, and do, occur in other patients, even in children. These reactions may be serious and can be fatal if not recognized. All but the "toxic nephritis" from dihydrostreptomycin occur within the first 50 days of treatment.

The program described has reduced the mean period of hospitalization to 139 days for the 109 patients admitted in 1956. It has decreased the cost of hospitalization by 50%. It has eliminated the need both for occupational therapy and rehabilitation because the patients are returned to their former occupations upon discharge regardless of the physical activity involved in their work.

Approximately 3% of all patients admitted to the hospital died of tuberculosis, chiefly children of 5 years or less with tuberculous meningitis. Another 3% died during hospitalization of associated disease, mainly in the age group of 55 years and over. About 2% remained chronic cases. Thus, a satisfactory result was obtained in 92% of all proved cases of tuberculosis.

Over the 5-year period included in this group, the number of new cases of tuberculosis found and the extent of the disease did not decrease. This program has received excellent patient cooperation as shown by the high rate of acceptance of the recommendation of resection (36% of all admissions) and the few irregular discharges (8%). Drug treatment of nonhospitalized patients with tuberculosis falls far short in every respect of what can be achieved with immediate hospital care. (Allen, A. R., Treatment of Tuberculosis Today - A Five-Year Report: Am. J. Med., XXV: 75-87, July 1958)

Oral Treatment of Diabetes

In the treatment of diabetes, insulin is irreplaceable; no satisfactory substitute has yet been discovered. However, the need for parenteral administration of insulin has stimulated the search for substances which will lower the blood sugar when given by mouth. Recently, certain sulphonylureas (notably carbutamide and tolbutamide) have been shown to do this. Unfortunately, sulphonylureas are effective in mild diabetes only; this is in accord with the experimental finding that some functioning pancreatic islet tissue is necessary for them to exert full action.

Ungar et al, in 1957, investigated a series of compounds of different structure belonging to the diguanide group and found that one of them, phenethyl diguanide or N-beta-phenethylformamidinyl iminourea (D. B. I.) was able to produce hypoglycemia even in eviscerated or alloxan-diabetic animals. Later, workers confirmed that this substance can lower the blood sugar in the absence of insulin.

This article assesses the effectiveness of D. B. I. as a hypoglycemic agent in diabetes of all grades of severity, gauges its side effects, and compares its mode of action with that of insulin and tolbutamide.

D. B. I. was demonstrated to be an effective hypoglycemic agent in mild and moderate diabetes. At a dosage of 50 mg. three times a day, it reduced the blood sugar to normal levels, in some cases, even in the presence of ketonuria, and in some patients who failed to respond to tolbutamide. Unfortunately, its administration was accompanied by gastrointestinal disorders in no less than two-thirds of the diabetics in whom it was used. Nausea, abdominal discomfort, vomiting and diarrhea were severe enough to necessitate withdrawal of the drug in these patients. Symptoms usually quickly subsided on cessation of treatment, but vomiting is a particularly unwelcome symptom in diabetics. No toxic effects were observed in the blood or in the liver of patients so far treated, but the period of observation has not extended for more than a few months.

Experimental evidence suggests that the drug has two main modes of action: first, it decreases the output of glucose from the liver by depressing gluconeogenesis and, second, it increases glucose utilization by the tissues. The authors' results support the view that D. B. I. does not act like insulin. In contrast to insulin, D. B. I. was quite unable to relieve acidosis in severe diabetics, and normoglycemia could be attained in only about one-third of diabetics to whom the drug was given.

The lack of effect of D. B. I. on the amino-acid nitrogen levels in the present trial indicates again that D. B. I. does not act like insulin. On the other hand, the impression was obtained that D. B. I. was more potent as a hypoglycemic agent than the sulphonylureas. As with tolbutamide, however, several days of treatment must elapse before maximal effect is demonstrated, and D. B. I., like the sulphonylureas, proves more effective in patients whose diabetes is of short duration.

The ultimate value of maintaining normoglycemia in diabetics by substances whose mode of action differs from that of insulin remains undecided. There is evidence that hyperglycemia per se is harmful if allowed to persist and can be responsible for the degenerative changes that occur in diabetics. Search for an effective nontoxic hypoglycemic agent is justifiable on these grounds. D.B.I.—although its range of action is probably wider than that of tolbutamide—is unsuitable for general use because of the high incidence of unwanted side effects. (Hall, G.H., Crowley, M.F., Bloom, A., Oral Treatment of Diabetes - Trial of Phenethyldiguanide (D.B.I.): Brit. Med. J., 5088: 71-74, July 12, 1958)

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Voluntary Retirement

Retirement after 20 or more years of service has been authorized since 1955, and a number of Medical Department officers have been granted this early retirement. It is felt that the availability of early retirement is a distinct addition to the attractiveness of a Navy career.

While general information on voluntary retirement appears to be widely distributed, letters and comments received indicate that some of the details are less widely known. The specific criteria prescribed by the Secretary of the Navy as meriting favorable consideration for early retirement are stated in SecNav Instruction 1811.3A of 10 September 1955, and anyone thinking of making such a request should be fully acquainted with this instruction as well as BuPers Instruction 1811.1A of 19 July 1957.

Among the six criteria listed is that of five years' service in grade for captains as well as 20 years' total service. Other of the listed criteria may be applicable to individual cases. Requests are considered on a basis of the over all needs of the Service and the merits of the individual case.

Requests should be submitted at least three months and not more than six months ahead of the desired date, and the preretirement physical must be reported to the Chief of Naval Personnel from one to three months in advance. BuPers requires that officers starting a new tour of duty complete at least one year at the new station before voluntary retirement is effected.

Obviously, an unexpected request for retirement creates problems in connection with a relief, and in some instances insufficient time has been allowed in which to arrange for a relief. Consequently, it is most desirable that BuMed be informed of prospective retirement plans as far as possible in advance of the prescribed three months lead time to insure that the desired retirement date can be met.

The Bureau is in no sense urging officers to consider early retirement. This note is simply to urge those who may be thinking of early retirement to become familiar with the requirements and proper procedure as detailed in SecNav and BuPers Instructions. (PersDiv, BuMed)

IN MEMORIAM

CAPT Wendell P. Blake MC USN (Ret)	25 June 1958
CAPT George F. Blodgett MC USN	9 July 1958
CAPT Charles J. Holeman MC USN (Ret)	21 June 1958
CDR Charles F. McCaffrey MC USN (Ret)	25 June 1958
CDR Talmadge Wilson MC USN (Ret)	15 June 1958
LCDR William A. Little MC USN (Ret)	14 March 1958
LT John A. Drawenek MSC USN (Ret)	12 June 1958
LT James J. Kelley MSC USN (Ret)	1 July 1958
LTJG Richard E. Jackson MSC USN (Ret)	16 July 1958

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From the Note Book

1. Seventeen inactive Reserve Medical Department officers attended the First Commandant's Representatives' Seminar held at the Bureau of Medicine and Surgery, August 4 - 8, 1958. Proposed by the Reserve Division of the Bureau, the seminar's purpose was to present an over all review of the Naval Reserve, the Navy's training programs for undergraduate medical students, and selected phases of recruiting concerning the commissioning of MD personnel. Reserve officers attending are presently on the faculty or teaching staffs of accredited medical schools throughout the United States. (TIO, BuMed)
2. Captain C. F. Gell MC USN has assumed the position of Special Assistant for Medical and Allied Sciences at the Office of Naval Research. Prior to reporting to ONR, Captain Gell was Director of the Air Crew Equipment Laboratory; Visiting Professor, Aviation Physiology at the University of Pennsylvania Medical School; and Lecturer in Aviation Medicine in the Graduate School of Medicine at the University. (ONR)
3. An 8-page supplement to the National Bureau of Standards Handbooks dealing with radiation protection and related matters has been prepared by the National Committee on Radiation Protection and Measurements (NCRP). Entitled Maximum Permissible Radiation Exposures for Man, the supplement summarizes the new recommendations of the NCRP on safe limits of radiation exposure; it extends and clarifies the Preliminary Statement issued by the Committee in January 1957. The new publication introduces only minor changes and is intended to be in general conformity with the philosophy expressed in the April 1956 statements of the International Commission on Radiological Protection (ICRP). (NBS)

4. In a reprint personally forwarded to the Editor, Captain A.G. Bower MC USNR reports in an article published in *Arizona Medicine*, October 1957, that "Beginning in 1948, gamma globulin was given to virtually every case of infectious mononucleosis admitted to his hospital. In more than 200 cases so treated, the result was excellent with only 2 exceptions; one was tracheotomized in a respirator because of an infectious neuronitis; the other was a complicating meningoencephalitis In the average case of infectious mononucleosis, in which the dose of gamma globulin is adequately assessed as to size, it acts as specifically as antitoxin does in diphtheria, and if too small a dose is given, there is no harm in repeating it." (See *Medical News Letter*, Vol. 32, No. 2, p. 7)
5. A review of the basic studies of the physiology and chemistry of psoriasis indicates that this is a hereditary disease showing a distinctive localization pattern and one in which the specific defect now appears to be in the enzyme systems concerned with the protein metabolism of the epidermis. (*Arch. Dermat.*, July 1958; W.B. Shelley, M.D., R.P. Arthur, M.D.)
6. A study of the occurrence of cervix cancer in an asymptomatic population, three quarters of whom return for repeat examinations, is presented. Exfoliative cytology utilizing direct cervical smears was the primary means of detection for 91% of the cancers found. The cytological false negative errors from all sources were less than 10% for a single examination. This error becomes vanishingly small with repeat examinations since the data suggests that the average in situ cancer exfoliates diagnostic cells for 8 or more years before becoming invasive. (*Cancer*, July - August 1958; J.W. Berg, M.D., G.M. Bader, M.D.)
7. A series of 96 bladder tumors occurring in women is reported. The salvage in the superficial tumors was 44.4%, in the deep tumors 12.1%, and in all cases 33.3%. In the same series, the 5-year salvage was 41% in the superficial tumors, 4.7% in the deep tumors, and 28.3% in all cases. The best results obtained in any group was in the group A tumors treated by means of interstitial implantation of radon seeds combined with electro-surgical resection or fulguration. (*J. Urol.*, July 1958; C.B. Brack, R.E.L. Nesbitt, Jr., H.S. Everett)
8. The results of repairing traumatic iris prolapses by replacement of the prolapsed iris have proved that this mode of repair is clinically sound and is to be preferred in suitable cases to the traditional method of abscission. A special technique recommended as a standard procedure consists essentially in an intraocular reposition carried out with a spatula through an incision at the limbus. (*Brit. J. Ophth.*, July 1958, R. Stein, Israel)

9. Esophageal disorders and disease may give rise to pain that is referred to the anterior part of the thorax. The pain may be situated some distance from the site of the esophageal involvement and may vary considerably in intensity and character. The possibility of an esophageal origin must always be considered in any patient with unexplained anterior thoracic pain. (Dis. Chest, July 1958; H. J. Moersch, M.D., F. E. Donoghue, M.D.)

10. Strangulated diaphragmatic hernia is a serious emergency with a relative high mortality. It is suggested that a more aggressive attitude be taken in treating this type of hernia before it becomes strangulated, as surgical repair of the hernia itself is simple with a very low mortality rate when no strangulation is present. (J. Thoracic Surg., July 1958; E. F. Skinner, M.D. et al.)

11. An autopsied case of pancytopenia associated with thymoma is described, and the published cases of this rare clinical syndrome are reviewed. The unusual frequency of spindle-cell thymomas associated with this syndrome is discussed. (New England J. Med., 17 July 1958; J. W. Josse, M.D., S. I. Zacks, M.D.)

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Applications for Training in Civilian Institutions

In view of the need for early commitments with civilian institutions for training programs to begin 1 July 1959, those medical officers interested in civilian training programs in Neurological Surgery, Thoracic Surgery, Plastic Surgery, Children's Orthopedics, or the subspecialties of Internal Medicine, are urged to submit their requests to the Chief, Bureau of Medicine and Surgery prior to 15 September 1958.

Individuals may indicate three choices of institutions in order of preference, where they desire the training; however, the Bureau of Medicine and Surgery will make all contacts and arrangements with the institutions for those approved by the Advisory Board, and applicants are cautioned not to make any personal contacts in an attempt to secure an appointment or obtain a tentative acceptance from the institution.

Applications from career medical officers qualified to enter these programs should be made by official letter to Chief, BuMed, via chain of command, and should include the obligated service agreement stipulated in BuMed Instruction 1520.7B. Only a limited number of individuals will be sponsored in such programs in view of the existent personnel shortage. (ProfDiv, BuMed)

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Symposium on Scintiscanning

The U. S. Naval Medical School, Bethesda, Md., will offer a one-day symposium on "Advances in Nuclear Medicine" on 4 October 1958. This symposium will be on Scintiscanning and will be the first general symposium on this technical clinical phase of Nuclear Medicine.

Twelve prominent speakers have been selected and the topics will cover all phases of clinical applications of scintiscanning plus reviews and critiques of methods of detection, collimation, shielding, and dosimetry involved in this procedure. Following the noon luncheon in the Officers' Mess, an open question and answer period will be held.

Medical Corps personnel desiring to attend the symposium should submit written requests in compliance with BuMed Instruction 1520.8. Such requests should be received in the Bureau prior to 9 September 1958 for consideration by the Advisory Board. If approved by the Advisory Board, TAD orders will be requested by the Bureau utilizing BuMed training funds.

Commanding officers may be guided by the following priorities for medical officers who may desire to apply for attendance at the symposium:

1. Chiefs of Radiological Service
2. Radiology Residents
3. Medical officers engaged in the clinical use of Radioisotopes

A second symposium will be conducted by the U.S. Naval Medical School, NNMC, Bethesda, Md., during the spring of 1959. This second symposium will cover Low Background Counting and the Evaluation of Radiation Casualties. When firm arrangements are completed, another article will be published giving full details. (ProfDiv, BuMed)

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Course in Occupational Medicine

A two-day course in Occupational Medicine is being offered by the Postgraduate Committee of the University of Maryland School of Medicine. The course will be held in Chemical Hall (on the campus), Lombard and Green Streets, Baltimore, Md., 16 and 23 October 1958 (a week interval between meeting days). The tuition is \$20.00.

Schedule for 16 October 1958 - first day

9:00 - 10:00 a.m.	Registration - Postgraduate Committee Office
10:00 - 12:30	Cardiac Disease in Industry (Panel: Cardiologist, full-time Industrial Physician, and Management)

12:30 - 1:30 p. m.	Luncheon
1:30 - 4:00	The General Practitioner in Industrial Medicine (Panel: Professional Educator, Member, Maryland Academy of General Practice; and "Small Industry" Physician)

Schedule for 23 October 1958 - second day

9:00 - 10:00 a. m.	Registration - Postgraduate Committee Office
10:00 - 10:20	Function of Governmental Groups in Occupational Health (Paper)
10:25 - 10:45 a. m.	Radiation (Paper)
10:50 - 11:10	Utilization of the Abilities of Older Individuals in Industry (Paper)
11:15 - 12:30	Medicolegal Aspects in Industrial Medicine
12:30 - 1:30 p. m.	Luncheon
1:30 - 4:00	The Role of Doctor, Nurse, Management, and Industrial Hygienist in Industrial Medicine (Panel: Doctor, Nurse, Management, and Industrial Hygienist)

Note: The audience will be given opportunity to ask questions of the panel members.

Medical Corps officers of the Regular Navy and Naval Reserve on duty at Naval activities not too distant from Baltimore may submit an official request for one or both days of this short course in occupational medicine to the Chief, Bureau of Medicine and Surgery in accordance with instructions contained in BuMed Instruction 1520.8 of 6 February 1956. Requests should reach the Bureau not later than 10 September 1958. (OccMedDispDiv, BuMed)

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Postgraduate Short Courses for Naval Medical
Officers - Sponsored by U. S. Army

The following postgraduate short courses will be given during Fiscal Year 1959 as indicated below. Eligible officers are those who meet the criteria prescribed by BuMed Instruction 1520.8 of 6 February 1956.

Eligible and interested officers should forward requests via official channels, addressed to the Chief of the Bureau of Medicine and Surgery. Requests for attendance must be received in BuMed at least 6 weeks prior to commencement of the course requested. Travel and per diem orders chargeable against Bureau funds will be authorized those approved for attendance.

<u>Course</u>	<u>Location</u>	<u>Dates</u>	<u>BuMed Quota</u>
James C. Kimbrough Urological Seminar	Brooke Army Medical Center	3-5 Nov. '58	5
Pathology of Diseases of Laboratory Animals	Armed Forces Institute of Pathology	8-12 Dec. '58	10

(ProfDiv, BuMed)

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Board Certifications of Inactive Reserve Officers

American Board of Anesthesiology

LT John R. Jones (MC) USNR

American Board of Dermatology

LTJG Fenwick L. Watts (MC) USNR

American Board of Internal Medicine

LTJG David S. Masland (MC) USNR

LTJG Stanley M. Pariser (MC) USNR

LTJG Carl Wierum (MC) USNR

LT William J. Williams (MC) USNR

American Board of Obstetrics and Gynecology

LT William E. Crisp (MC) USNR

CDR Forrest H. Howard (MC) USNR

LT Myles C. Morrison, Jr. (MC) USNR

American Board of Pediatrics

LT Ralph J. Bertolin (MC) USNR

American Board of Psychiatry and Neurology in Psychiatry

LT Charles E. Meredith (MC) USNR

American Board of Surgery

LT William P. Corvese (MC) USNR

LTJG Frederick M. Davies (MC) USNR

LCDR LeRoy F. Lundy (MC) USNR

LT Robert D. Rector (MC) USNR

American Board of Urology

LCDR Henry E. Wolfe, Jr. (MC) USNR

Recent Research Reports
(Continued from 18 July issue)

Naval Dental Research Facility, NTC, Bainbridge, Md.

1. Electrophoresis of Saliva. III. Relationship of Protein Components to Dental Caries, NM 75 01 26.05, 2 June 1958.
2. Dental Caries Susceptibility Before and After the Extraction of Teeth. NM 75 01 26.03, 10 July 1958.

Naval Medical Research Institute, NNMC, Bethesda, Md.

1. Studies on Steroid Excretion in Calf Urine. NM 01 02 00.02.04, 3 January 1958.
2. Adrenal and Reproductive Responses to Population Size in Mice from Freely Growing Populations. NM 24 01 00.04.02, 13 January 1958.
3. Hematological Values of Guinea Pigs. Memorandum Report 58-1, NM 62 04 00.03, 21 January 1958.
4. Thermal Radiation Burns in Rabbits. VI. The Effect of the Immediate Application of Cold to "Flash"-Type Burns on Severity as Measured by Radioactive Phosphorus Uptake. NM 007 081.03.07, 21 January 1958.
5. Normal Fecal Excretion Values for Coliforms and Enterococci. NM 52 04 00.02.05, 27 January 1958.
6. Studies on Mineral Metabolism in the Albino Rat. I. Occurrence of Urinary Calculi. NM 75 01 00.01.03, 27 January 1958.
7. Polynucleotides II. Physical Properties of Solutions of Some Polynucleotides. NM 02 01 00.01.03, 3 February 1958.
8. Physiochemical Characterization of a Compound Isolated from Bovine Spinal Cord. Memorandum Report 58-2 related to NM 02 06 00.02, 6 February 1958.
9. Heat Changes During the Clotting of Fibrinogen. Memorandum Report 58-3 related to NM 02 05 00.07, 24 February 1958.
10. Measurement of Changes in Acetylcholine Level in Rat Brain Following Ammonium Ion Intoxication and Its Possible Bearing on the Problem of Hepatic Coma. NM 72 02 00.01.01, 20 March 1958.
11. Spectral Changes Accompanying Binding of Several Dyes by Polyadenylic Acid. Memorandum Report 58-4 related to NM 02 01 00.01, 21 March 1958.
12. Comparison of Several Methods for Producing Solubilized Human Keratin. NM 71 07 00.04.01, 27 March 1958.
13. Polynucleotides V: Titration and Spectrophotometric Studies upon the Interaction of Synthetic Polynucleotides with Various Dyes. NM 02 01 00.01.04, 1 April 1958.
14. Summaries of Research. 1 July 31 December 1957.

Naval Medical Research Unit No. 3, Cairo, Egypt

1. Observations on Egyptian Hyalomma Ticks (Ixodoidea, Ixodidae). 6 Biological Notes and Differences in Identity of H. Anatolicum and its Subspecies Anatolicum Koch and Excavatum Koch among Russian and Other Workers. Identity of H. Lusitanicum Koch. NM 52 08 03.12, December 1957.
2. Histopathology of Cardiopulmonary Schistosomiasis, Review of Literature. NM 52 02 03.9, January 1958.

Naval Medical Research Laboratory, Submarine Base, New London, Conn.

1. Personal Inventory Barometer (PIB) I. Development of the Questionnaire. NM 23 02 20, Subtask No. 1, Report No. 1, 22 August 1957.
2. Limited Field Evaluation of the Millipore Field Monitor Kit Aboard Submarines. NM 24 01 20.04.03, 19 March 1958.
3. A Group Automatic Audiometer in a Hearing Conservation Program. Memorandum Report No. 58-3. NM 22 01 20.03.01, 24 March 1958.
4. Proposed Specification for Audiometers. Memorandum Report No. 58-5, NM 22 01 20.03.02, 28 March 1958.
5. Energy Integration in the Ear. Memorandum Report No. 58-6, NM 22 01 20 .03.03, 4 April 1958.

Naval School of Aviation Medicine, NAS, Pensacola, Fla.

1. Effect of Shouting on Blood Oxygen and Alveolar Carbon Dioxide. Report No. 1, Subtask No. 3, NM 12 01 11, 15 November 1957.
2. A Note on Occupational Ratings of Security and Prestige. Report No. 5, Subtask No. 4, NM 16 01 11, 25 November 1957.
3. Ballistocardiogram During Muscular Relaxation with Succinylcholine. Report No. 4, Subtask No. 6, NM 18 03 11, 21 January 1958.
4. A Note Concerning "Motion Sickness" in the 2-FH-2 Hover Trainer. Report No. 1, Subtask No. 3, NM 17 01 11, 20 February 1958.
5. Oxygen Toxicity in Aviation Medicine - A Review, Report No. 2, Subtask No. 11, NM 12 01 11, 24 February 1958.
6. Effect of Breathing 100% Oxygen at Atmospheric Pressure upon the Visual Field and Visual Acuity. Report No. 1, Subtask 11, NM 12 01 11, 11 March 1958.

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Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget 19 June 1958.

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DENTAL**SECTION**

Forty-Sixth Anniversary Greetings

Doctor William R. Alstadt, President of the American Dental Association, addressed the following letter to Rear Admiral R. W. Malone, Dental Corps U. S. Navy, Assistant Chief for Dentistry and Chief, Dental Division, Bureau of Medicine and Surgery.

"Rear Admiral R. W. Malone (DC) USN
Assistant Chief for Dentistry and
Chief, Dental Division
Bureau of Medicine and Surgery
Navy Department
Washington 25, D. C.

Dear Admiral Malone:

On August 22, 1958, the Dental Corps of the U. S. Navy will celebrate its 46th anniversary. In behalf of the more than 90,000 members of the American Dental Association, may I extend to you and all members of the U. S. Navy Dental Corps our sincere congratulations upon this occasion.

The American Dental Association, of which you and the members of the Navy Dental Corps are full members, is extremely proud of the splendid record that all of the officers helped to create since the beginning of your Corps on August 22, 1912. In my various capacities with the American Dental Association through these past years, I have been privileged to note in great detail the splendid professional service, excellent morale, and the fine sense of duty that your members exhibit.

The record of the U. S. Navy Dental Corps is one that the members of the American Dental Association looks to with pride, and you, as Chief of the Dental Division, are carrying on a splendid tradition that has been so well established by your eminent predecessors.

Sincerely,

W. R. Alstadt, D. D. S.
President"

Navy Dental Care - FY 1958

Dental care was provided to Navy and Marine Corps personnel during Fiscal Year 1958 at four hundred and seventeen Navy dental facilities ashore and afloat throughout the world. In addition, dental care was provided to personnel in many areas of the United States where no permanent dental facilities are available by dental officers attached to the Navy mobile dental units. Approximately eight million dental examinations, treatments, and operations were accomplished in all branches of dentistry except orthodontics for military personnel and their dependents.

Fiscal Year 1958 was the first complete fiscal year in which dependents outside the continental limits of the United States and at specifically designated "remote areas" within the continental limits of the United States received dental care under the Dependents' Medical Care Act. During this period, some three hundred and thirty thousand dental procedures were accomplished for approximately ninety thousand dependents.

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RESERVE SECTION

Seminar for CO's of Reserve Medical Companies

During the period 20-24 October 1958, a seminar for Commanding Officers or their representatives of Reserve Medical Companies will be presented at the Bureau of Medicine and Surgery.

Approximately twenty Medical Corps and Medical Service Corps officers of medical companies established within the First, Third, Fourth, Fifth, Sixth, Eighth, and Ninth Naval Districts are expected to attend.

The program as planned will present an over all review of the Naval Reserve with special emphasis on training in the Navy's Medical Department. Officers and departments of the Department of Defense, Chief of Naval Operations, Bureau of Naval Personnel, and the Bureau of Medicine and Surgery will highlight the seminar by presentations affording an insight to their functions at a departmental level. Field trips to the National Naval Medical Center, Armed Forces Institute of Pathology, National Institutes of Health, Naval Gun Factory, and Naval Diving School assure a most interesting and informative period of training for this group of selected officers during this period. The Reserve Division, Bureau of Medicine and Surgery conducts this seminar on a year to year basis.

Correspondence Course Training

INSECT AND RODENT CONTROL - NavPers 10705-A. 1957 edition, recommended for all Medical Department personnel.

Advances in knowledge of the life history and habits of pests, the introduction of new materials in building construction, and the discovery of new chemical agents have been utilized in combination to broaden understanding of means for controlling disease vectors. From these advances, it has been possible to make pest control more effective. This course provides MD personnel with information pertaining to insects and rodents, their living habits, the manner in which they spread disease, and the diseases with which they are associated. It includes instructions for proper methods utilized in preventing and correcting infestation. It indicates what poisons should be used to control various kinds of pests and the dangers involved in the use of each poison. It also advises on methods of handling materials to avoid dangerous results.

The course consists of two (2) objective type assignments and is evaluated at six (6) Naval Reserve and/or nondisability retirement points. Naval Reserve personnel who previously completed the correspondence course entitled, "Insect, Pest, and Rodent Control," NavPers 10705, will receive additional credit for completing this course.

MEDICAL SERVICE IN JOINT OVERSEAS OPERATIONS - NavPers 10769. 1957 edition, recommended for all Medical Department personnel.

This course is designed to familiarize senior staff officers of the Armed Services with the general doctrines, organization, and practices of the joint medical services of the Army, Navy, and Air Force, and with problems involved in the employment of these medical services in joint overseas' operations. The course material concentrates on the over all mission of military medical service and includes a brief consideration of each of the medical services individually. The technique of employment of joint medical service is discussed from the aspects of the estimate, plan, and operation. Throughout the text, the use of technical medical terminology and doctrine has been avoided. Discussions concerning the unilateral employment of each medical service provide background information and delineate certain responsibilities.

The course consists of two (2) objective type assignments and is evaluated at six (6) Naval Reserve promotion and/or nondisability retirement points.

Applications for the above courses are submitted on NavPers 992 (Rev. 1-57) appropriately completed and forwarded via your Commandant to the Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md.

Multiple Enrollment. Medical Department personnel may be enrolled in more than one MD correspondence course at one time.

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Catalog of Correspondence Courses

A printed booklet listing all the Medical Department correspondence courses available to inactive Reservists may be obtained at no cost by letter or postcard addressed to:

Commanding Officer
U. S. Naval Medical School
National Naval Medical Center
Bethesda 14, Md.

In addition to providing a biographical summary on each of the courses offered, general information concerning eligibility, application instructions, enrollment, study material, requirements for completion and recording of promotion point credits is furnished. This informative catalog is a handy convenient size that is an important reference to the Reservist participating in correspondence course training. (Naval Medical School, NNMC)

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AVIATION MEDICINE DIVISION



Aeronautical Adaptability

The dictionary indicates that the word "aeronautically" originates from the Latin "aer" meaning air, and the Latin "nauticus" meaning pertaining to a seaman, sailor, or ship. From the dictionary standpoint, "adapt" is a transitive verb from the Latin "ad" plus "aptare" to fit, from "aptus", fit. Synonyms of adapt are: adjust, accommodate, conform, reconcile. It specifically implies modification to meet new conditions and connotes pliability or readiness and implies bringing into as exact or close a correspondence as exists between parts of a mechanism, but suggests more tact or more ingenuity. It implies a giving or yielding in to the requirements

or demands. It implies a bringing into accordance with a pattern, example, or principle. It implies the demonstration to one's own or another's satisfaction, of the consistency or congruity of things that are, or seem, to be incompatible. "Adaptability" is the noun form corresponding to the verb "adapt." Therefore, aeronautical adaptability literally means a "seaman, sailor, or ship" which, or who, is "suitable, fit, or adjusted to the air."

A definition for aeronautical adaptability used by a senior flight surgeon previously attached to the Bureau of Medicine and Surgery was: "Aeronautical adaptability is a mental adjustment which is made in the transition from the normal terrestrial locomotion of man to the abnormal conditions of aerial flight. On the one hand, the normal elements of anxiety and fear tend to deter, while motivation based upon confidence in one's ability to control the physical forces which sustain flight, induces man to fly."

Relative to the Air Force attitude toward the subject, there is information in the Air Force Flight Surgeon's Manual (AF Manual 160-5), page 185, as follows: (Quote) "Refusal to Fly. There is the flyer who after one or two missions—even before reaching combat—voluntarily and apparently on a very conscious level, refuses to fly. The conscious motivation in such cases may be more apparent than real because the mechanism of displacement operates in this instance. Such individuals constitute a somewhat complex problem. The flight surgeon's function in this particular case is to determine the medical aspects of the individual's refusal to fly. Each case requires careful consideration and evaluation. Psychiatrically, these men demonstrate evidence of a low anxiety threshold, so that threat to self-preservation, along with their poorly developed personality structure, forces them to take the only steps which they know to allay this anxiety directly. Disposition of individuals who refuse to fly is extremely important, especially from the standpoint of group morale and motivation. It is deleterious to motivation and morale to excuse through medical channels an individual who has failed to perform his duties. Extreme care should be taken in excusing medically an individual who refuses to fly, and psychiatric evaluation should be obtained if it is deemed necessary. From a military administrative point of view, such cases are ordinarily considered not unconsciously motivated' and, therefore, become an administrative problem." (Unquote)

The Air Force policy has been discussed with a representative of the Air Force Surgeon General's office. Their policy seems to be a firm approach and is as follows: If an individual submits a request to discontinue flying, he is examined by the flight surgeon. It is felt that the flight surgeon's responsibility is not to make an administrative decision, but to determine "is he sick" or "is he not sick," "does he have a psychoneurosis" or "does he not have a psychoneurosis." If he is truly sick, and has a definite diagnosable emotional problem or psychoneurosis, he is then admitted to the sick list and handled via medical channels. If he is not one who actually needs

medical care, he then is handled administratively. The pilots are placed in three categories by length of service since designation; i. e.,

- (1) those with less than 10 years' service since designation
- (2) those with more than 10, but less than 15 years' service since designation
- (3) those having completed more than 15 years' service since designation.

If an individual in the first group (less than 10 years' service since designation) submits a request to discontinue flying,, in general, it is not looked on favorably as a lot of money has been spent on him and the Air Force has a big investment in him and he is obligated to perform. His case goes to a board and a decision is made. Usually, the decision is that he must fly or he is considered to be not of good caliber and his commission is revoked if a Reserve officer. If a Regular officer, he reverts to his permanent rank. Exceptions are made in rare instances when the officer is especially adept at some line of endeavor and his services are especially desired. In general, pilots with less than 10 years' service cannot "turn in their wings." If an individual in the second group (with more than 10 years' but less than 15 years' service since designation) submits a request to discontinue flying, a board considers his case and his request may or may not be approved. If an individual in the third group (more than 15 years' service since designation) submits a request for discontinuing flying, his request under usual circumstances will be granted. This policy was formulated and crystallized during the Korean conflict when it was brought out (Air Force) that it is not the medical department's responsibility to make a determination regarding the flight status of well aviators—the problem is administrative. It was determined that there are combat people trained in different lines of endeavor—i. e., infantrymen, gunners, medics, supply personnel, communications, specialists, flyers, et cetera,—and all must produce when needed and cannot be permitted to fail to produce just because of personal desires. They classify fear of flying into two categories:

(1) Fear of flying with emotional disturbances, psychoneurosis diagnosable and labeled. These are medical cases and are medically treated and processed.

(2) Fear of flying with no emotional or psychoneurotic basis. They are boarded and possibly separated from service and it is a blot on their record.

With reference to naval aviators, the question has been posed, "If a pilot decides that he just doesn't want to fly any more, is he considered to be not aeronautically adapted?" Naval aviation personnel "who just don't want to fly any more" should submit a request to that effect to the Chief of Naval Personnel in accordance with BuPers Instruction 1611.6, paragraph 4.c.(7), which states: (Quote) "Naval aviators who desire to terminate their flight status shall be immediately suspended from further flight duties by the

commanding officer and shall be directed to submit an official request to the Chief of Naval Personnel via the chain of command, and to the Chief of Naval Operations (Op-54). A report on the case by a flight surgeon shall accompany the request. " (Unquote)

The examining flight surgeon in any specific case may be of the opinion that the examinee is aeronautically adapted or is not aeronautically adapted based on the "picture as a whole." If the flight surgeon were expected to automatically say "not aeronautically adapted," there would be no need for flight surgeon evaluation and the decision could be made by administrative personnel. The decision should be arrived at on a medical basis considering background and all related factors and circumstances, and the flight surgeon's conclusion should be on medical grounds instead of an administrative basis. To answer the above-posed question specifically, the answer is "No"; if a pilot decides that he just doesn't want to fly any more, he is not necessarily considered to be "not aeronautically adapted." He may be either aeronautically adapted or not aeronautically adapted and it is the flight surgeon's responsibility to make such a determination in each case.

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Aircraft Accident Reporting - New Form

New aircraft accident, incident, and ground accident reporting procedures became effective on 1 July 1958 with the publication of OpNav Instruction 3750.6C. Each flight surgeon should have received a copy of this instruction from the Naval Aviation Safety Center during July. The following is quoted from the Safety Center's covering letter:

"Attached is a copy of OpNav Instruction 3750.6C, Navy Aircraft Accident, Incident, and Ground Accident Reporting Procedures, which became effective 1 July 1958 replacing OpNav Instruction 3750.6B. Unfortunately, there are not enough copies available for each Naval Flight Surgeon to have a personal copy. This copy is intended as a permanent part of the medical department literature. In order to assure its availability to the unit's medical department, it is requested that upon your detachment from your present unit, you turn it over to your relief.

This instruction has undergone almost complete revision and it will not be possible for you to fulfill your obligations as a member of your unit's aircraft accident board without the information contained therein. You will find detailed instructions in Section H regarding the preparation of the new Medical Officer's Report of Aircraft Accident, Incident, or Ground Accident, OpNav Form 3750-8, 8A, 8B, 8C, 8D, and 8E (Rev-5-58). Although this form will not be available for 2 to 3 months, the majority of information contained in this section will be of value in the preparation of the present MOR, OpNav Form 3750-8 (Rev-2-54)"

A speedletter, dated 30 June 1958, was sent to all major commands with information that these new Medical Officer's Report Forms would not be available for 2 to 3 months.

It is desired that all flight surgeons study the Medical Officer's Report section of the new OpNav Instruction in preparation for use of the new form.

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Naval Aviator - Flight Surgeon

For a number of years, the Chief of Naval Operations has permitted the Chief of the Bureau of Medicine and Surgery to nominate a limited number of qualified flight surgeons for training as naval aviators. Those flight surgeons who successfully complete the training syllabus are designated naval aviators and are ordered to duty as such in the actual control of aircraft. This is in addition to duties for which they are assigned as a medical officer.

In the near future, there will exist vacancies for several naval aviator-flight surgeons and it is desired that deserving, well motivated, 35 years of age or younger, and physically qualified Regular U. S. Navy flight surgeons fill these vacancies. Successful candidates shall be assigned to test pilot billets connected with the human engineering phases of the Navy's developmental programs, as well as other related operational and administrative assignments.

Those active duty flight surgeons, U. S. Navy or U. S. Navy Reserve who will transfer to the Regular Navy, who are particularly desirous of becoming naval aviators are invited to apply for flight training by letter request to the Chief, Bureau of Medicine and Surgery, Aviation Medicine Operations Division, Navy Department, Washington 25, D. C. Those flight surgeons who complete the training and are designated as naval aviators shall incur a service obligation of 3-1/2 years following date of designation. Additional information concerning time and duration of training and other questions will be answered to parties requesting same.

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Occupational Health Hazards

Industrial preventive medicine is an important facet of aviation medicine that is occasionally slighted in favor of the more glamorous aspects of flight surgery. Ground crew personnel are particularly exposed to many occupational health hazards that are foreign to flight personnel. With this in mind, the following excerpts from Occupational Health Reports to the

Bureau are reprinted. An alert flight surgeon with knowledge of potential occupational health hazards can prevent the occurrence of serious or even fatal situations.

1. Ground check of a J-57 engine with after burner was done along the seawall about 75 feet from the boathouse and 300 feet from a hangar. Sound levels were in excess of 140 db inside the boathouse and approximately 128 db at the end of the hangar. A new location in an isolated area has been prepared and is in use for turn-up of aircraft engines with after-burner. Acceptable sound attenuating structures or devices have not been obtained to permit turn-up in populated areas.

2. An old engine test cell used for reciprocating engines was modified to handle J-65 jet engines. The effectiveness of acoustical attenuation achieved by the noise silencing system was tested using the Aircraft Industries Association's "Uniform Practices for the Measurement of Aircraft Noise." In this method, one set of measurements is taken inside the test cell to the rear of the engine outside the stack exhaust stream. Inside the test cell, the microphone is positioned two engine nozzle exit diameters off the exit centerline and two such diameters downstream. Several other intermediate positions are also specified in this scheme. The results indicated that the degree of attenuation is much less than that of test cells specifically built for jet engines. Detailed data is available which may serve as a guide to other naval activities who may wish to evaluate their test cell silencing effectiveness.

3. A survey of noise exposure from ground-check operations of A4D aircraft equipped with the J-65 engine and with a deflecting shield placed approximately 50 feet from the exhaust and revealed maximum noise pressure levels (NPL) of 140 db just off the port side of the tail end at full power; at a distance of 100 feet from port side as well as 100 feet from the starboard side of the tail end—120 db; at a distance of 80 feet on line from the center of the deflecting shield—120 db; at a distance of 220 feet from the tail end—110 db; at a distance of 150 feet on line from the nose of the plane—105 db. With only the starter on and at a distance of 30 feet from the center of the plane, readings of 120 db were obtained. NPL of 132 db were obtained while testing the emergency generator. Men servicing the aircraft were found wearing the approved MSA Noisefoe ear cushions and some were found wearing ear plugs in addition to the ear cushions. The recommended use of ear-defenders in addition to the over-the-ear protectors was emphasized. Inasmuch as the present conditions constitute a health hazard, a request was made to the Bureau of Aeronautics for permission to purchase jet engine noise suppressors so as to eliminate the high noise levels among ground-check personnel and also among personnel working in the surrounding areas and buildings.

4. Noise level measurements (101) were made aboard an aircraft carrier under repair. Approximately 82% of the employees were exposed to noise levels between 80 and 99 db during the working day; about 10% were exposed to levels above 100 db. The skills involved were welders, shipfitters, electricians, electronics mechanics, machinists, pipefitters, chippers, and riveters.

5. Three paint removing compounds, Clarco Stripper, Turco #4377B, and Harco #95-1-A, used for stripping paint from aircraft, were evaluated for relative degree of toxicity. Chamber tests run under simulated conditions in the laboratory showed the following:

<u>Material</u>	<u>Concentration of Alkali in the Air (as ppm of NH₃)</u>	<u>pH</u>
Clarco Stripper	470	11.5
Turco #4377B	610	12.1
Harco #95-1-A	1360	12.2

Field tests taken during actual use of paint removing compounds on aircraft gave the same relative degree of atmospheric contamination as found in the laboratory. Harco#95-1-A creates the most health hazardous conditions and should be replaced by a less toxic stripper unless the work space is equipped with adequate exhaust ventilation.

6. In the repair of Radomes, it is necessary to strip the outside rubberized film. The specification for the job calls for use of methyl-isobutyl-ketone without detailing the method of application. During a routine shop visit, it was noted that a strong ketone odor was emanating from one corner. In that location, it was found that large Radomes were placed on a pallet in front of a large side-draft hood; the Radomes were each wrapped with a cloth and buckets of solvent were then poured over them. A small portion of the solvent was absorbed by the cloth and was active in removing the rubber film, but the bulk of the solvent just ran down the sides and into the deck drain leading to the storm sewer. The pallet and the deck around it were slippery with a rubber jelly. Test of the air contamination made with Davis Vapometer Model M-6 revealed methyl-isobutyl-ketone vapor concentration near the operator as varying from 200 to 500 ppm, well in excess of the threshold limit value of 100 ppm. Investigation showed that the side-draft hood was not functioning. The over all solvent consumption rate for this operation was 750 gallons per month. It was pointed out to the shop supervisor that several serious hazards were being created:

- a. A health hazard due to operator's exposure to solvent vapors
- b. A fire and explosion hazard due to run-off of a flammable liquid into the deck drain

c. A safety hazard due to slippery footing.

At a cost of \$1 per gallon for the solvent, \$500 per month was being literally poured down the drain. Recommendations included modifying the operating procedures by first soaking the cloth to the Radomes, placing a catch-pan under the pallet, and repair of the ventilation system.

7. A proposed method for reclaiming contaminated cellulube hydraulic fluid includes a washing operation followed by heating to about 85° C. and agitation with air to remove the last traces of moisture. Because of the presence of aryl phosphates in this type of hydraulic fluid, it was felt that an evaluation of the respiratory hazard should be made. Tests conducted during a pilot-plant operation in an indoor location indicated less than 0.3 ppm of tricresyl phosphate in areas of maximum possible contamination. The concentration during full-scale operation will probably be less because the operation will be conducted outdoors. Because this value is well below the recommended safe limit of 1.0 ppm and exposure periods will be brief, no respiratory protection appears to be necessary. Exposed workers will be instructed in the procedures required to prevent skin absorption.

8. An employee who entered an elevator sump tank aboard a carrier collapsed within a few minutes and was removed almost immediately by two employees who happened to notice his plight. He recovered rapidly with no residual effects other than a feeling of shakiness and a slight difficulty in breathing. The tank was not tagged as gas-free, but the employee felt that it was safe for entry because he was under the false impression that welding had been performed in the tank the night before. On investigation, it was found that the ship's force had used nitrogen to remove moisture from the hydraulic system. The amount of oxygen present in the tank at the time of entry could not be determined since the tank was blown out with air before tests could be made. Steps are being taken to stress the importance of complying with shipyard instructions which prohibit entry into tanks that are not tagged with a valid gas-free tag.

9. The presence of contaminants in liquid oxygen (LOX) supplied to this and other Southern California stations was tentatively traced to pollutants in the air used for LOX production. It was recommended that better filtration of the air be performed prior to its liquifaction and that Norite-C carbon filters in 6 to 12 mesh size be used for the purpose as they have been found extremely efficient for this type of filtration. (Derived from Occupations Health Reports, Jan. 1958 through Mar. 1958)

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Postgraduate Short Courses in Aviation Medicine
to be Conducted During the Fall 1958 at the
Ohio State University and U.C.L.A.

OHIO STATE - The Ohio State University announces the Fifth Annual Postgraduate Course in Aviation Medicine to be held at the University in Columbus, Ohio, 8-12 September 1958. This interesting and informative course is presented to physicians and workers in the allied sciences with interests in the exciting fields of aviation and space medicine. Major areas considered are physiology of flight, clinical pathology, aviation accidents, medical evaluations of air crews, and space medicine. Included in the tuition fees will be a field trip to Wright Air Development Center. Interested individuals should make all inquiries and applications to:

Dr. William F. Ashe, Chairman
Department of Preventive Medicine
The Ohio State University
Columbus 10, Ohio

U.C.L.A. - The University of California at Los Angeles announces the Fourth Annual Symposium in Aviation Medicine to be held 22-24 October 1958 at the Miramar Hotel, Santa Monica, Calif. A rather comprehensive program covering future jet aircraft transports, space medicine, low altitude-low speed flying, and flight safety has been scheduled. A field trip to one of the nation's leading aircraft manufacturers should prove to be of interest. The range of discussion covers military, commercial, and private flying aspects of the above categories. Requests for information and/or applications for this symposium should be made to:

Thomas H. Sternberg, M.D.
Assistant Dean for Postgraduate
Medical Education
University of California Medical Center
Los Angeles 24, Calif.
Telephone: Los Angeles GRanite 8-9711 or
BRadshaw 2-8911, ext. 7114

Interested and eligible officers within the local areas may request authorization orders with the Bureau of Medicine and Surgery paying tuition fees. A very limited number of requesting officers not locally situated will be given per diem orders to these courses. Those interested officers who are eligible in accordance with BuMed Instruction 1520.8 of 6 February 1956, should forward requests for attendance via channels to the Chief, Bureau of Medicine and Surgery. These requests must be received in this Bureau at least six weeks prior to commencement of the course requested. Travel and per diem orders chargeable against Bureau funds will be authorized to those approved for attendance.

"G" and "U"

How about a little refresher on g's? As you know, the onset of "grey-out" can be noted by the average observer at 3-4 g's, while he "blacks out" on the average of 4-5 g's. Anything that can be done to raise the vascular (blood vessel) pressure in his eyes will increase his g tolerance—g suits can raise the level 2 g's above his nonprotected tolerance. The prone position shortens the heart-to-eye level distance about one-half and increases the tolerance to about 12 g's.

Forces of 6 g's will black out practically every upright observer unless he is wearing a good g suit. Turns of the following radii will each produce 6 g's.

250 m. p. h.	686 ft.
500 m. p. h.	2,740 ft.
750 m. p. h.	6,170 ft.
1000 m. p. h.	11,132 ft.
1500 m. p. h.	25,074 ft.
2000 m. p. h.	44,530 ft.

At a speed of 2000 m. p. h., the pilot could not turn a circle smaller than 18 miles in diameter unless wearing a good protective suit or assuming a position other than upright without being blacked out all the way around the turn.

Head-to-foot forces of inertia can be impaired by mechanical factors, such as large varicose veins, hernia, or hemorrhoids, and therefore, contraindicate exposure to acceleration. In the case of negative acceleration, a congenital or acquired defect of the skull is an absolute contraindication because the resulting failure of body counter-pressure might permit disastrous bulging of the cranial contents.

Anything that reduces blood pressure will also reduce tolerance to positive acceleration. Some factors could be heat, relaxation, prolonged bed rest, disease, or fatigue. On the other hand, factors that increase the blood pressure will increase tolerance. Normally, there is a higher tolerance to g's during flight than when just seated in the upright position. This is ascribed to the higher blood pressure and the nervous and muscular tension while flying. Cold, anxiety, mental or physical stress will usually increase tolerance.

It is interesting to note that a low blood sugar, hypoxia, or alcohol ingestion carried to the point of blood pressure reduction, diminishes tolerance; but, on the other hand, in their early stages of excitation, these agents will increase tolerance to gravitational stress.

Bear in mind that while recovery from blackout occurs a few seconds after acceleration decreases, it takes much longer (20-30 seconds) to recover from unconsciousness. This thin margin separating blackout from unconsciousness can be dangerous. Visual symptoms may be accompanied

by poor judgment and deficient performance; the danger of allowing these symptoms to occur should be obvious. Don't forget that being in good physical condition helps a lot. If the pilot increases his muscular tension and "fights" the acceleration by using the M-1 maneuver, he may be able to raise his tolerance to 7 or more g's.

Do not expose yourselves to negative accelerations in excess of 2-3 g's. If it is unavoidable, relax—do not strain. Straining will aggravate the symptoms of fullness or throbbing pain in the head or eyes, "blood shot" eyes, and a nervous reflex which slows down the heart and may cause failure of circulation through the brain. Higher accelerations of 3-4 negative g's will lead to intense pain, severe nose bleeds, and bleeding into the sinuses. (Captain R.G. Witwer MC USN, Marine Corps Air Station, Quantico, Va.)

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Hypoxia - Hyperventilation or CO₂?

The conclusion is drawn that the most common symptom of hypoxia is hyperventilation which would explain the similarity between the two.

The best way to rule out hypoxia is to inspect the oxygen equipment. If there is no evidence of malfunction, hypoxia can be eliminated in most instances. It must be appreciated that insignificant mask leaks at ground level may become quite significant at altitude.

If a subject is experiencing symptoms, it is recommended that he set the oxygen regulator on "emergency," or pressure setting, depending upon the regulator. At the same time, he should: (1) check his oxygen equipment, (2) begin to descend to below 15,000 feet, and (3) breathe at a normal rate and depth of respiration for one to two minutes. If symptoms do not improve significantly, the regulator should be returned to its original setting and the automix turned to 100% oxygen and breathing continued at a normal rate for 15-20 minutes. Explanations for these recommendations are:

(1) Switching over to an emergency or pressure setting will by-pass a ruptured diaphragm in the regulator or probably reveal its presence, or compensate for a mask leak.

(2) Descending below 15,000 feet increases the time of useful consciousness.

(3) Breathing at a normal rate and depth aids in consciously controlling the respiration; improvement should rapidly result. If these procedures have not improved the symptoms, 100% oxygen should be inhaled at a normal pressure to avoid rapid depletion of the aircraft supply.

The final recommendation of breathing 100% oxygen for 15 minutes is made because recent evidence has shown that carbon monoxide poisoning is a form of anemic hypoxia. If toxic concentrations were present, it would

take at least 15 to 20 minutes of breathing 100% oxygen to achieve desaturation and improvement of symptoms.

If pilots were able to carry out the above recommendations in the presence of hypoxia, hyperventilation, or carbon monoxide poisoning, although they may not be immediately aware of the source of their difficulty, it would constitute the proper corrective action. (Captain H. H. Wayne USAF (MC): Journal of Aviation Medicine, Vol. 29, No. 4. pp., 307-315, April 1958)

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Change of Address

Please forward requests for change of address for the News Letter to: Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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